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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,886	01/16/2002	Valery V. Felmetsger	SPUTT-57354	7950

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ELLSWORTH R. ROSTON, ESQ.
FULWIDER PATTON LEE & UTECHT, LLP
Howard Hughes Center
6060 Center Drive, Tenth Floor
Los Angeles, CA 90045

EXAMINER

CHAMBLISS, ALONZO

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/051,886

Applicant(s)

FELMETSGER, VALERY V.

Examiner

Alonzo Chambliss

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-69 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 59-64 is/are allowed.
- 6) ☒ Claim(s) 1,3-20,22-58 and 65-69 is/are rejected.
- 7) ☒ Claim(s) 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. In view of the Appeal Brief filed on 8/9/04, PROSECUTION IS HEREBY REOPENED. The non-final rejection set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 and 3 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Ueno (U.S. 6,294,444).

With respect to Claims 1 and 3, Ueno in the background of the invention discloses removing a thin layer (i.e. silicon oxide film) from the surface of a wafer to eliminate any impurities from the surface of the wafer and thereafter creating microscopic roughness on the surface of the wafer to receive a deposition of the material on the surface. Microscopic roughness on the surface of the wafer is created by providing ions of an inert gas (i.e. argon) on the surface of the wafer with an insufficient energy to etch the surface of the wafer but with a sufficient energy to create the microscopic roughness on the surface of the wafer (see col. 1 lines 66 and 67 and col. 2 lines 1-38). Sufficient energy to create the microscopic roughness is present, since a gas environment with argon introduced to the surface of the wafer will generate some level of microscopic roughness.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueno (U.S. 6,294,44) as applied to claim 1 above, and further in view of Hong (U.S. 6,375,810) and Hori et al. (U.S. 6,399,41).

With respect to Claim 4, Ueno fails to disclose the wafer disposed on a wafer land and wherein a layer of chromium is deposited on the wafer land after the

Art Unit: 2814

microscopic roughness has been produced on the surface of the wafer. However, Hong discloses a wafer disposed on a wafer land 8 and wherein a layer of aluminum or copper or tantalum is deposited on the wafer land 8 (see 5 lines 36-40; Figs. 1 and 3). Since the wafer is prepared for the deposition of material as taught by Ueno, the aluminum or copper or tantalum is deposited after the microscopic roughness has been produced on the surface of the wafer. It is well known in the semiconductor industry that pure metals include aluminum, copper, tantalum, or chromium as evident by Hori (see col. 9 lines 6-10). Thus, Ueno and Hong have substantially the same environment of deposition of material on a substrate in an argon filled chamber. Therefore, it would have been obvious to incorporate a wafer land to support the device of Ueno, since the wafer land would support the substrate during the deposition of material as taught by Hong.

Claims 5-20, 22-58, and 65-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueno (U.S. 6,294,44) and Hong (U.S. 6,375,810) as applied to claims 1 and 4 above, and further in view of Stress Control in Multi-Layer Backside Metallization of Thinned Wafers (TW article), the Admitted Prior Art and Tailoring Sputtered Cr films on Large Wafer article (LW article).

With respect to Claims 5, 7, 9-12, 15, 17, 20, 22, 29, 32, 34, 35, 39, 42-44, 46-55, and 66-69, Ueno in the background of the invention discloses removing a thin layer (i.e. silicon oxide film) from the surface of a wafer to eliminate any impurities from the surface of the wafer and thereafter creating microscopic roughness on the surface of the wafer to receive a deposition of the material on the surface. Microscopic

roughness on the surface of the wafer is created by providing ions of an inert gas (i.e. argon) on the surface of the wafer with an insufficient energy to etch the surface of the wafer but with a sufficient energy to create the microscopic roughness on the surface of the wafer (see col. 1 lines 66 and 67 and col. 2 lines 1-38). Sufficient energy to create the microscopic roughness is present, since a gas environment with argon introduced to the surface of the wafer will generate some level of microscopic roughness. Hong discloses a wafer disposed on a wafer land 8 and wherein a layer of aluminum or copper or tantalum is deposited on the wafer land 8 (see 5 lines 36-40; Figs. 1 and 3). Ueno-Hong discloses the claimed invention except thereafter depositing a chromium layer with a low intrinsic tensile stress on the cleaned surface of the wafer with a low stress value and thereafter depositing a layer of nickel vanadium with an intrinsic stress on the surface of the chromium layer to neutralize the low intrinsic tensile stress produced by the chromium layer. TW article discloses depositing (i.e. atomically bonding) a chromium layer with a low intrinsic tensile stress on the cleaned surface of the wafer with a RF bias power and thereafter depositing a layer of nickel vanadium with an intrinsic stress on the surface of the chromium layer to neutralize the low intrinsic tensile stress produced by the chromium layer (see pages 4-15) . The atomic bonding is inherently produced between the chromium in the chromium layer and the microscopically rough surface of the wafer of Ueno. Thus, Ueno and the TW article have substantially the same environment of deposition of material on a substrate in an argon filled chamber. Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the chromium and nickel vanadium on the

Art Unit: 2814

substrate of Ueno, since the chromium and nickel vanadium would facilitate a stress control bonding between the metals and the substrate as taught by the TW article.

With respect to Claim 6, 8, 13, 14, 16, 24-27, 30, 31, 33, 36-38, 40, 41, 45, 65, the TW article discloses a chamber is provided in which to perform the recited steps and wherein molecules of an inert gas argon flow through the chamber in an order of three (3) to five (5) standard cubic centimeters per minute (3-5 sccm) in an environment of (5-15sccm) (see pages 4 –15 and Tables 1 and 2). Thus, the chromium is deposited on the wafer at a low rate of flow of an inert gas and wherein the RF bias power is applied during the deposition of the nickel vanadium layer on the chromium layer to produce the low intrinsic compressive stress in the nickel vanadium layer. It is well known in the semiconductor industry to have a RF power or no RF power when depositing a metal layer (i.e. Chromium) as evident by LW (see page 5).

With respect to Claims 18, 19, 23, 28, 56-58, the TW article discloses a layer of metal selected from the group consisting of gold, silver and copper is deposited on the surface of the layer of nickel vanadium and wherein the nickel vanadium layer has a low intrinsic compressive stress to neutralize the low intrinsic tensile stress in the chromium layer and any stress in the metal layer selected from the group consisting of gold, silver and copper (see pages 9-15). It is well known to solder an electronic component to the layer of metal selected from the group consisting of gold, silver, and copper as evident by the Admitted Prior Art (see page 2).

Allowable Subject Matter

4. Claims 59-64 are allowed.
5. Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowance subject matter: the prior art of record does not teach or suggest the combination of a lens shield is disposed in a spaced relationship to the wafer land and the lens shield is grounded and wherein the RF bias power for the deposition of the layer of nickel vanadium is provided between the wafer land and the grounded lens shield in claim 21.

Providing a flow of an inert gas in the order of forty (40) to fifty (50) standard cubic centimeters per minute through a chamber containing the wafer to etch a microscopic layer of material with impurities from the surface of the wafer and provide an atomic roughness to the wafer surface, thereafter providing a flow of an inert gas through the chamber at a flow rate of approximately forty (40) to fifty (50) standard cubic centimeters per minute and a power in the order of six hundred watts (600 W) to twelve hundred watts (1200 W) to clean the surface of the wafer and increase the roughness of the wafer surface, disposing the wafer on a wafer land, and then providing a flow of an inert gas at a rate through the chamber at a low power in the order of fifty watts (50 W) to one hundred watts (100 W) to provide the surface of the wafer with the microscopic roughness in claim 59.

The combination of an inert gas is argon and wherein the wafer disposed on a wafer land and wherein a layer of chromium is deposited on the wafer land after the microscopic roughness has been produced on a the surface of the wafer in claim 67.

A chamber is provided in which to perform the recited steps and wherein molecules of [the] an inert gas flow through the chamber in an order of three (3) to five (5) standard cubic centimeters per minute (3-5 sccm) in claim 14.

The prior art made of record and not relied upon is cited primarily to show the process of the instant invention.

Conclusion

3. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (571) 272-1927.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system see <http://pair-dkect.uspto.gov>. Should you

Art Unit: 2814

have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC_Support@uspto.gov.

AC/November 15, 2004

A handwritten signature in black ink, appearing to read "Alonzo Chambliss". The signature is fluid and cursive, with the first name "Alonzo" and last name "Chambliss" clearly distinguishable.

Alonzo Chambliss
Primary Patent Examiner
Art Unit 2814